The Ottawa GRASS Users Group Presents

Tutorial # 3

Building a GRASS Dataset for Ottawa, Ontario

Part 1

How I learned to Stop Worrying and Love Mining for Free Geospatial Data in Canada

Prepared by:

Dave Sampson

HB Outdoor Recreation, Parks Tourism

BA Geography

For:

Ottawa GRASS Users Group

Canadian GRASS Community

International GRASS Community

Table of Contents

About the Document....3
Document History....3
Contacts....3
Online Linkage:....3
Introduction:....4
Agreements of use:....4
Document distribution....4
Dataset Overview....5
Geobase....5
Statistics Canada....5
Getting the data....5
Search for NTS Mapsheets....5
Geobase....6
Statistics Canada: Road Network....7
Statistics Canada: Dissolved Census Data Community Profiles....7
Statistics Canada: Electronic Area Profiles....8
Notes....8
Local data from the National Framework....9
Conclusion....10
Future Work....10
About the Contributors....10
Dave Sampson....10

About the Document

Document History

Version	*Date*	*Revisions*	*Authors*	*Sponsor*
1	02/04/06	1	Dave Sampson	Ottawa GRASS Users Group

Contacts

- Dave Sampson (dr.sampson at sympatico dot ca)

Online Linkage:

- http://cemml.carleton.ca:8080/ogug

Introduction:

This tutorial could be the beginning of a wonderful discovery or rediscovery of using geographical data without breaking the bank. GRASS is open source and free to use, and so is the data presented in this tutorial (unless otherwise specified).

We here at the Ottawa GRASS users Group have been using the spearfish datasets for many of our tests and education with GRASS. This tutorial aims to develop an Ottawa version of the spearfish data based off of as much free and unrestricted use data possible.

This tutorial will emphasize how GRASS has the ability to use data from multiple sources. We will be battling data from different sources, with different projects, different accuracies and many other subjective differences. It is the job of the technician (you) to recognize these limitations and present the final findings accordingly. This is where Art meets Science.

Please provide ample feedback so we can better this document.

Agreements of use:

All data even if it is free comes with a license agreement. Verify all license agreements before using the mentioned data to ensure your use is within the agreed license. By following this tutorial you agree to all the licenses that accompany the data. It is up to you the user to ensure its proper use. This tutorial merely connects all the sources and processes for you.

Document distribution

Dataset Overview

Geobase

Digital Elevation Data (download)
Geopolitical Boundaries(download)
Geodetic Network (order)
Landsat 7 and control points (order)
geographical Name (order)
National Road Network (download)

Statistics Canada

Road Network
Census Profiles

Getting the data.

Search for NTS Mapsheets

Online linkage: http://maps.nrcan.gc.ca/topo_metadata/index_e.php

many of the public sources we will use for building our local and national datasets refer to NTS map sheets. The National Topologic System (NTS) is a means of cataloging topographic data by mapsheets. As we move into the digital realm some of the basic cartographic storage and catalog methods are still used. Some may also refer to the NTDB, or the National Topologic Data Base. NTS is specific to map sheets and NTDB refers to coverages stored in Sherbrooke, Quebec. As far as I can tell at least.

This tool helps us determine what map sheets we want to be looking for and using. This does not help us for Landsat Imagery though.

1. Select 'geographical Name Query'
2. enter 'Ottawa' into the search dialog

RETURN: **Ottawa Ont.** City Carleton; Russell 031G05

3. Click on the MAP to verify your search graphically
4. Click on INFO for more information

Name :Ottawa

Province/Territory : Ontario

Feature type : City

Location : Carleton; Russell

Latitude - Longitude : 45° 16' 00" N - 75° 45' 00" W
NTS Map : 031G05

CGNDB Unique Identifier :

5. Click on 'All NTS Maps'
6. You now have enough info to search GEOBASE for mapsheets of your area of interest

Geobase

Online Linkage: http://www.geobase.ca/

1. when you first login you need to register. After you register you have unrestricetd acces to the data
2. Select DATA drop down tab found at upper left.
3. Select 'Geopolitical Boundaries'
4. Download Data
5. ESRI Shapefile, geographic (HTTP)

6. From Data Select 'Digital Elevation Data'
7. Download data
8. Select 1:50 000 map
9. Select 031 map tile
10. Select 031-G-05 (NTS 031G05)
11. Submit request
12. Download file (HTTP or ftp)

13. Repeat these steps for;

* Geodetic Network (order):
Base network
bench marks

3d desification

* Landsat 7 and control points (order):
Landsat Orthorectified imagery: 016029, 016028
Band Selection: All bands
Projection: LCC
Format: Geotiff (per band)
compression: zip (or tar if you are using *nix environment)

* geographical Name (order):

* National Road Network (download):
Ontario

Note: Some data needs to be ORDERED. No this does not cost. A script compiles the info on their server. It sends you an e-mail when it is ready. Select ESRI .shp files

Statistics Canada: Road Network

on line Linkage: http://www.statcan.ca/

1. Choose language
2. Select Census 2001 (http://www12.statcan.ca/english/census01/home/index.cfm)
3. Select 'Data' from left menu bar
4. Select 'Road Network File, 2005'
5. Choose language, format (shp), geography (Ontario)
6. Read and accept license
7. Download

Statistics Canada: Dissolved Census Data Community Profiles

having access to basic census data is great. It is also a fantastic way to ensure you use data that our taxes have already paid for. This data can help with many types of geographic queries.

1. Select 'Data' from the side bar
2. Select '2001 Community Profiles'
3. Enter 'Ottawa' for place name
4. Select 'Ottawa'

5. Check out some of the data
6. Now is this Ottawa the new amalgamation of Ottawa the old city? On the right menu bar select 'Geographic Hierarchy'. Voila. There is a difference between a city and census division. Select Ottawa Division (Census Division)
7. Some of the numbers have changed in the table. Select 'Geographical Hierachy' again
8. Now we see that within the division there is a city and a bunch of dissolved municipalities. Select 'Ottawa (city)'
9. Select 'Map'. We see this includes all the municipalities as aggregate data.
10. Close the window
11. On the right menu bar select 'Download File', name it 'Ottawa_all'
12. Now choose 'Nepean (city)' as a dissolved municipality
13. Download the file. Repeat for all of the Dissolved Municipalities (or ones of interest)

We will try to merge this data with our geographic info. (some day). It should be straight forward as they download into Coma Separated Values (CSV). The universal interchangeable column/row text file. Rename the files with a CSV or TXT extension if you want to remember. You can open these files in any text editor. Spread sheets will build tables out of theses files. Then its up to databasees, primary keys and linkages to connect the data to the geography. If you develop the process before we do, please post solutions here.

Statistics Canada: Electronic Area Profiles

on line Linkage: http://www12.statcan.ca/english/census96/data/profiles/Index.cfm

So as we drill down in the realm of free data it gets more challenging, but the tools still exist. This section will apply to the following profiles found on the Stats Can website

- Profile of Census Metropolitan Areas and Census Agglomerations, 1996 Census
- Profile of Census Divisions and Subdivisions, 1996 Census
- Profile of Federal Electoral Districts (1996 Representation Order), 1996 Census
- Profile of Census Metropolitan Areas, Tracted Census Agglomerations and Census Subdivisions, 1996 Census

Notes

By now you should be getting a handle of some of this web based data mining. If you are a true propeller head you'll notice the possibilities of scripting this data extraction. Take this URL:

http://www12.statcan.ca/english/census96/data/profiles/DataTable.cfm?YEAR=1996&LANG=E&PID=35782&S=A

Plop it into your broswer and start changing some values. Have fun

1. From the right menu in the community profiles select '1996 Electronic Profiles'
2. Select 'Profile of Federal Electoral Districts (1996 Representation Order), 1996 Census'
3. Now look for your area of Interest. I chose Nepean, of course. Which uses the following URL: http://www12.statcan.ca/english/census96/data/profiles/DataTable.cfm?YEAR=1996&LANG=E&PID=35257&S=A&GID=267721

   Lets examine the URL.
   Year makes sense,
   Language is english,
   Product ID refers to the Electoral Profiles product
   GID refers to The specific profile. For this case it is Nepean.

4. Moving along lets scroll to the bottom of the page.
5. Select the format to download the file it. CSV is pretty safe
6. Rename the file name to something that makes sense. Eg Nepean_Elect

Now this new file is about 3 times the size of our community profile. So we have more data. The question is how useful. I'll leave that to you to decide. So this interface allows us access to more info, but some nice search tools would have been nice and ability to select multiple profiles. But that's the cost of free data.

Enjoy your census data gathering and play with it in GRASS. And don't forget about the Metadata.

Local data from the National Framework.

Of course after you have gathered together the GRASS Canadian National Framework dataset there would be great coverages to extract for Ottawa. One step at a time though.

Conclusion

Now that you have an idea of how to gather some basic base data to use in GRASS for the Ottawa area the challenge will be the import and manipulation. You will have multiple projects and degrees of accuracies. This is where data massaging comes in. Also data formats become a challenge but GRASS has tools. It is just a matter of learning how to use them.

I hope you've learned something about free geographic data in Canada and I encourage you to check out Tutorial #4 as we explore datasets to create a national GRASS dataset for Canada.

Future Work

This document will continue to evolve and always Welcomes feedback and contributions. Some future additions we hope to have.

- more description of tools, process, theory and potential application
- Some screen shots of the tools
- A means to ensure we keep this document up to date as on line tools change.

About the Contributors

Dave Sampson

Dave is a Geographer specializing in Geograpic Information Systems (GIS). Dave has achieved an Honours of Outdoor, Recreation, Parks and Tourism and a Bachelor of Arts in Geography from Lakehead University in Thunder Bay, Ontario, Canada. He is particularly interested in the applications of GIS and Remote sensing in the management of parks and protected areas.

Dave was exposed to GRASS during university even though it was not in the curriculumn and few people had ever heard of it. He picked it up along with an interest in other open source projects. Dave is still very interested in its continued evolution getting closer to mainstream commercial acceptance. He formed the Ottawa GRASS (GIS) Users Group (OGUG) with the help of Scott Mitchel – a professor at Carleton University.

On line profile: http://cemml.carleton.ca:8080/OGUG/Members/drsampson/emp/